# PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

## Improvements relating to Floor Treating Appliances

We, HOOVER LIMITED, a Company, registered under the laws of Great Britain, of Perivale, Greenford, Middlesex, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to floor treating appliances including means for dispensing liquid on to a floor, means for scrubbing it, and means for sucking up dirty liquid from the floor. An object of the invention is to provide a compact and efficient form of such appliance.

According to the present invention a floor treating appliance includes a reservoir for clean liquid, means for dispensing clean liquid from the lower part of the reservoir on to the floor, means for scrubbing the floor, means for sucking up dirty liquid from the floor, and a reservoir for dirty liquid in which the reservoir for dirty liquid is in the form of a collapsible receptacle and is removably mounted and nested within the upper end of the reservoir for clean liquid, so that although the clean liquid and dirty liquid are prevented from mixing at least a part of the space originally occupied by clean liquid can be subsequently occupied by dirty liquid.

The means for sucking up dirty liquid preferably include a separator for separating air from the liquid communicating with a nozzle, and means for applying suction to the separator, and the clean liquid reservoir is in the form of an open-topped vessel having means for effecting a sealed suction joint between its upper edge and the separator to maintain suction within it.

Preferably a vent is provided interconnecting the upper parts of the clean liquid reservoir and dirty liquid receptacle to equalise the pressures in them.

The dirty liquid receptacle is conveniently of such size that substantially the whole of the space initially occupied by the clean liquid can be subsequently occupied by the dirty liquid, and the reservoir for clean liquid and separator are preferably capable of being readily separated to permit removal of the dirty liquid receptacle for emptying and filling the clean liquid reservoir. The dirty liquid receptacle can be, for example, in the form of a bag formed of flexible material and is supported by its mouth which is positioned at the open mouth of the clean liquid reservoir. The bag may conveniently be in the form of thermoplastic sheet material.

The clean liquid reservoir preferably forms the lower part of a casing whereof the upper part accommodates the separator and a motor fan unit for producing suction to suck up the dirty liquid. The nozzle is conveniently situated at the lower end of the casing and a suction pipe extends from the nozzle along the underside of the casing and opens into the separator, and a handle forming an apparent continuation of the suction pipe also extends along the underside of the casing to a point beyond its upper end.

The invention may be carried into practice in various ways but one specific embodiment will be described by way of example with reference to the accompanying drawings in which:—

Figure 1 is a side elevation of a floor scrubber with the squeegee unit in place;

Figure 2 is a partial side sectional elevation on a larger scale showing the scrubbing sponge in position;

Figure 3 is an enlarged sectional elevation showing the two-purpose receptacle, and

Figure 4 is a similar view showing the receptacle open and the dirty liquid bag partially removed.

As shown in Figure 1 the floor scrubber 10 is mounted on wheels 11 and comprises two sections 12 and 13 hinged together at 14 and held closed by a latch 15.

The lower section 12 comprises a two-purpose receptacle 16, a suction nozzle 17, and

*[Price 3s. 6d.]*

suction tube 18 extending from the suction nozzle along the underside of the lower section 12 to its upper end. The lower section also includes a valve actuator 19 and a dispensing tube 20. The suction nozzle may be fitted with either a squeegee unit 21 as shown in Figure 1 or a scrubber unit 22 including a sponge rubber pad as shown in Figure 2.

As shown in Figure 3 the upper end of the suction tube 18 fits into a bore 24 in a lug 23 formed integral with the upper end of the two-purpose receptacle 16. The tube may be a press fit in the bore. The lower end of the suction tube 18 is a press fit in a bore 25 in the suction nozzle 17, and communicates with the suction passage 26 in it as shown in Figures 2 and 3.

The upper section 13 includes an air and water separator including a casing 27, a motor-fan unit 28 and a handle 29 which is received in a bore 30 in a lug 31 projecting from the casing 27, and is in line with the suction tube 18 so as to appear to form a continuation of it. As shown in Figure 3 the lug 31 has in it an L-shaped suction passage 32 one end of which registers with the upper end of the suction tube 18 whilst the other end opens into the casing 27 of the separator. The latter may be of any suitable known construction.

The motor-fan unit 28 includes a fan 33 having an inlet eye 34 communicating with the interior of the casing 27 of the separator, and and exhaust outlet 35 for dry air, The motor-fan unit 28 is connected to an electric supply through a cable 36, a switch 37 and a plug 38. The cable extends up through the handle 29 and out through a hole 39 in it. The handle may be provided with cleats 40 and 41 for storing the cable.

The outer and lower part of the two-purpose receptacle 16 forms a reservoir for storing clean detergent liquid 42, which can be dispensed through a valve 43 normally held closed by a spring 44, through the dispensing tube 20 to the floor. The valve can be opened by the valve actuator 19 which is in the form of a cam acting on the outer end of the stem of the valve 43. The slope of the cam is such that when it is pressed downwardly the valve will be held open by friction. A light spring 45 tends to raise the valve actuator to allow the valve to close. The valve actuator may be moved progressively so as to open the valve to different degrees.

As shown in Figures 3 and 4 a collapsible bag 46, for containing dirty detergent liquid, is removably mounted within the two-purpose receptacle 16 so as to receive the dirty detergent liquid from the separator 27. The bag 46 may be made of any suitable water-impervious flexible material, preferably a thermoplastic material. An eyelet 47 is provided in the side of the bag near its upper edge in order to equalise the pressure inside it and that outside it.

The bag 46 may be removably supported within the receptacle 16 in any suitable manner. In the arrangement shown it comprises a flared mouth 48 which is held between two supporting rings 49 and 50 which are formed of plastic material and may be readily collapsed to remove the bag 46 and replace it by a new one if that should be considered necessary or desirable. The outer ring 50 is shaped to fit into a shouldered recess 51 in the top of the receptacle 16 for supporting the bag. Suitable gaskets 52 and 53 are provided between the mating surfaces of the sections 12 and 13 to maintain an airtight seal between them when they are clamped together.

The scrubbing unit 22 includes a sponge rubber scrubbing pad 56 suitably secured to a backing member 57 which closes the suction mouth 55 of the suction nozzle when the scrubbing unit is inserted. The squeegee unit 21 includes squeegee blade 54 which is constructed in known manner to collect dirty detergent solution from the floor and deliver it to the suction mouth 55 as the device is moved over the floor. The scrubber unit 22 and the squeegee unit 21 are detachably secured to the suction mouth 55 in any suitable manner so as to be readily interchangeable.

In operation the receptacle 16 is filled with clean detergent liquid to the level indicated by the dotted line 62 in Figure 3. The collapsible bag 46 will then collapse and float on the surface of the detergent liquid as indicated in dotted lines.

Assuming the appliance is to be used first as a floor scrubber the scrubber unit 22 is secured to the nozzle 17. The valve actuator 19 is then moved down to open the valve 43 to a sufficient extent to dispense clean detergent liquid from the tube 20 at a suitable rate. As the appliance is moved to and fro across the floor the clean detergent solution will be deposited on the floor and the sponge rubber pad 56 will thoroughly distribute it and rub the floor with it, the liquid becoming dirty in the process.

When the scrubbing operation is completed the valve actuator 19 is moved up to allow the valve to close and shut off the supply of detergent. The scrubbing operation may of course be continued after the supply of detergent has been shut off. Alternatively the valve 43 may be alternately opened and closed during the scrubbing operation to dispense detergent liquid as required.

To suck up the dirty liquid from the floor the scrubbing unit 22 is removed, the squeegee unit 21 is attached in its place, and the motor-fan unit is switched on by the switch 37. It will be appreciated that whereas the scrubbing unit 22 closes the nozzle mouth 55 the squeegee unit leaves it open. The appliance is then moved over the previously scrubbed floor and draws a mixture of dirty liquid and air through the squeegee unit 21 up the suc-

tion passage 26 and suction tube 18 and through the passage 32 into the interior of the separator 27. Here the dirty detergent liquid will be separated from the air stream and will fall into the collapsible bag 46 whilst the clean dry air will be drawn through the fan eye 34 and discharged through the opening 35.

As the clean detergent liquid is dispensed from the receptacle 16 the liquid level will fall as indicated for example by the level 60 in Figure 3. Then when the dirty detergent liquid is discharged into the bag 46 the latter will assume a position similar to that shown in full lines in Figure 3 with the bottom of the bag 46 somewhat below the level 60 of the clean detergent liquid 42.

Whilst the collapsible bag 46 is thus shown for clarity as being smaller than the receptacle 16, it will in practice generally be made large enough to substantially fill the interior of the receptacle 16 when the bag 46 is full of dirty detergent liquid. In this way the complete capacity of the receptacle is available for the storage of clean detergent liquid at the start of the scrubbing operation, and the same capacity is available to store the dirty detergent liquid at the end of a scrubbing operation.

When the motor-fan unit is running it will produce a suction within the collapsible bag 46 but the venting eyelet 47 ensures that the suction will also be communicated to the outside of the bag so that the effect will not be to collapse the bag. If the user should inadvertently leave the valve 43 open, the suction in the receptacle 16 will prevent the discharge of detergent solution.

After a scrubbing operation the latch 15 is released and the upper section 13 swung away from the lower section 12 about the hinge 14 as indicated in Figure 4 to allow the bag 46 to be withdrawn and the dirty liquid to be emptied away if further scrubbing is to be performed a new charge of detergent liquid is poured into the receptacle 16 before the bag 46 is put back in position.

WHAT WE CLAIM IS:—

1. A floor treating appliance including a reservoir for clean liquid, means for dispensing clean liquid from the lower part of the reservoir on to the floor, means for scrubbing the floor, means for sucking up dirty liquid from the floor, and a reservoir for dirty liquid, in which the reservoir for dirty liquid is in the form of a collapsible receptacle and is removably mounted and nested within the upper end of the reservoir for clean liquid, so that although the clean liquid and dirty liquid are prevented from mixing at least a part of the space originally occupied by clean liquid can be subsequently occupied by dirty liquid.

2. An appliance as claimed in Claim 1 in which the means for sucking up dirty liquid include a separator for separating air from the liquid communicating with a nozzle, and means for applying suction to the separator, and the clean liquid reservoir in in the form of an open-topped vessel having means for effecting a sealed suction joint between its upper edge and the separator to maintain suction within it.

3. An appliance as claimed in Claim 2 in which a vent interconnects the upper parts of the clean liquid reservoir and dirty liquid receptacle to equalise the pressures in them.

4. An appliance as claimed in any one of the preceding claims in which the dirty liquid receptacle is of such size that substantially the whole of the space initially occupied by the clean liquid can be subsequently occupied by the dirty liquid.

5. An appliance as claimed in any one of Claims 2 to 4 in which the reservoir for clean liquid and separator are capable of being readily separated to permit removal of the dirty liquid receptacle for emptying and filling of the clean liquid reservoir.

6. An apliance as claimed in any one of Claims 2 to 5 in which the dirty liquid receptacle is in the form of a bag formed of flexible material and is supported by its mouth which is positioned at the open mouth of the clean liquid reservoir.

7. An appliance as claimed in Claim 6 in which the bag is formed of thermoplastic sheet material.

8. An appliance as claimed in Claim 2 or Claim 3 in which the clean liquid reservoir forms the lower part of a casing whereof the upper part accommodates the separator and a motor-fan unit for producing suction to suck up the dirty liquid.

9. An appliance as claimed in Claim 8 in which the nozzle is situated at the lower end of the casing and a suction pipe extends from the nozzle along the underside of the casing and opens into the separator, and a handle forming an apparent continuation of the suction pipe also extends along the underside of the casing to a point beyond its upper end.

10. A floor treating appliance as specifiically described herein with reference to the accompanying drawings.

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4. An appliance as claimed in any one of the preceding claims in which the dirty liquid receptacle is of such size that substantially the whole of the space initially occupied by the clean liquid can be subsequently occupied by the dirty liquid.

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